

## EVALUATION OF AGRONOMIC TRAITS FOR PROMISING CHEWING VARIETIES OF SUGARCANE

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### ABSTRACT

A good number of chewing varieties of sugarcane are being cultivated from the very old days in different parts of the country, which is grown mostly following local and inappropriate production technologies which gives poor yield and quality of canes. The management practices for chewing cane vary from place to place and even from farmers to farmers. A field experiment was conducted during the year of 2016-2017 in two district of Bangladesh which are Jamalpur and Sherpur for screening out of suitable chewing varieties in this region. The experiment was comprising of five treatment such as T<sub>1</sub>=BSRI Akh 41, T<sub>2</sub>=BSRI Akh 42, T<sub>3</sub>=I 61-90, T<sub>4</sub>=VMC and T<sub>5</sub>=China. The study revealed that the highest number of tiller, millable cane and yield was found in the treatment of BSRI Akh 41, followed by BSRI Akh 42 and I 61-90 but in the economic point of view BSRI Akh 42 was more acceptable than the clone I 61-90. But considering juice production, clone I 61-90 is better. Therefore, the clone I 61-90 and the variety BSRI Akh 42 may be recommended for commercial cultivation as chewing varieties in Bangladesh.

**Key words:** Per Sugarcane, varieties, yield.

### Introduction

Sugarcane (*Saccharum officinarum* L.) is an important cash crop of the tropics and subtropics and main source of white sugar in Bangladesh. Alexander's army saw sugar cane during their conquest of India in 326 BC (Purse glove, 1989). Amongst all sugarcane growing countries of the world the position of Bangladesh are sixteenth in respect of area and twenty-first in respect of cane production. Sugarcane occupies 2.03 percent of net cropped area (BBS, 2005). In Bangladesh the yield of cane per unit area is the lowest in the world (Hossain, 2001). Sugarcane juice is widely consumed by people of the tropics and subtropics. It has been used to cure jaundice and liver-related disorders in Indian systems of medicine. The aqueous extracts of three varieties of sugarcane showed good antioxidant properties and were also able to protect against radiation induced DNA damage in pBR322 plasmid DNA and *Escherichia coli* cultures (Lu Nai *et. al.*, 2004). They also reported that sugarcane juice have the ability to scavenge free radicals, reduce iron complex and inhibit lipid per oxidation, may explain possible mechanisms by which sugarcane juice exhibits its beneficial effects in relation to its reported health benefits. Cultivation of chewing sugarcane plastic shed used to create a microclimate in favour of chewing sugarcane growth and encouraging early maturity. Using this method during 2002-03 in Zhejiang, China resulted in marginal sugarcane areas in Northern China reaching early marketing, increases in stalk yields and economic benefits. In Bangladesh, sugarcane growers follow two methods of cultivation viz. conventional and spaced Transplanting (STP). In conventional method sugarcane setts having three buds are directly planted in the trench, but in STP method sugarcane seedlings are raised either in polythene bags or in soils bed and then transplanted in the main field at a desired spacing. Conventional method cannot ensure regular germination and very often gaps are found in the field. The average yield of cane in Bangladesh is very poor compared to other developed cane growing countries like Brazil, Hawaii, Mauritius, Japan, Australia etc. Temperature and soil moisture are the two important factors affect germination of sugarcane buds under field condition. In our country sugar and gur producing varieties are cultivated in large scale but chewing varieties are cultivated in very limited area due to limitations of irrigation and scarcity of high land. The demand of

chewing cane is increasing day by day and there is a scope to expand the area under chewing cane cultivation particularly in the non mill zone areas (AEZ 9). Some promising clones having chewing characters are being cultivated in different side of the country. Therefore, the present work was considered for selection of suitable chewing sugarcane varieties at AEZ 9.

### Materials and Methods

The experiment was conducted during November 2016 to December 2017 at Sherpur and Jamalpur district of Bangladesh. Plot size of the experiment was 8 m x 6 m. Row to row spacing and set to set spacing was maintained 1 m and 0.45 m, respectively. Two eyed sugarcane settlings were used to conduct the experiment. The soil of the experimental plot was sandy loam in texture having pH 5.4, poor in organic carbon and available N, medium in K and S, rich in P and Zn content. The treatments of the experiment comprised five Chewing variety of sugarcane such as T<sub>1</sub>= BSRI Akh 41, T<sub>2</sub>=BSRI Akh 42, T<sub>3</sub>=I 61-90, T<sub>4</sub>=VMC, T<sub>5</sub>=China. The experimental design was randomized complete block design (factorial) with three replications. The crop was fertilized with cowdung 10 t ha<sup>-1</sup>, Urea 350 kg ha<sup>-1</sup>, TSP 275 kg ha<sup>-1</sup>; MOP (Muriate of potash) 220 kg ha<sup>-1</sup>. Total amount of cowdung, TSP (triple superphosphate) and 1/3 of each urea and MOP were applied during final land preparation. The rest of urea and MOP were applied in three equal installments at 15, 30 and 45 days after transplanting. Irrigation was done after application of fertilizer. Other intercultural operations and plant protection measures were taken as deemed needed. Data was collected on different yield contributing characters and yield. Recorded data were analyzed statistically and means were compared by LSD (Least Significant Difference) (Gomez and Gomez, 1984)

### Results and Discussion

**Growth and yield contributing character of chewing variety of sugarcane:** Result (Table 1) revealed that, number of tiller, millable cane, height, girth, brix % and yield of cane showed statistically significant difference among the tested varieties/genotypes. Highest number of tiller was found in BSRI Akh 42 (101.90 x 10<sup>3</sup>ha<sup>-1</sup>) which was followed by I 60-90 (86.510 x 10<sup>3</sup>ha<sup>-1</sup>) that was identical to the clones VMC (86.167 x 10<sup>3</sup>ha<sup>-1</sup>) and the lowest was obtained in China (68.88 x 10<sup>3</sup>ha<sup>-1</sup>) which was statistically identical to BSRI Akh 41(71.803 x 10<sup>3</sup> ha<sup>-1</sup>). The highest number of millable cane was found in VMC (79.027 x 10<sup>3</sup> ha<sup>-1</sup>) which was followed by I 61-90 (71.873 x 10<sup>3</sup>ha<sup>-1</sup>) and the lowest was obtained in China (53.540 x 10<sup>3</sup>ha<sup>-1</sup>). On the other hand, the highest height of cane was found from BSRI Akh 42 (2.76 meter) which was identical to I 61-90 (2.74 meter) and the lowest height of cane was found from the treatment China (1.61 meter). The study also revealed that the highest girth of cane was found from the treatment China (9.94 cm), the second highest girth of cane was found from the treatment BSRI Akh 42 (9.433 cm) and the lowest height of cane was found from the treatment VMC (7.61 cm). Highest yield of cane was obtained in I 61-90 (129.99 t ha<sup>-1</sup>). The second highest yield of cane was found in BSRI Akh 42 (114.77 t ha<sup>-1</sup>) and the lowest yield was found from the treatment China (106.8 t ha<sup>-1</sup>).

On the other hand, (Table 2) it was revealed that, number of tiller, millable cane, height, girth, brix % and yield of cane showed statistically significant difference among the tested varieties/genotypes. Highest number of tiller was found in BSRI Akh 41 (173.28 x 10<sup>3</sup>ha<sup>-1</sup>) and the second highest number of tiller was found from the treatment VMC (170.02 x 10<sup>3</sup>ha<sup>-1</sup>) which was statistically identical to BSRI Akh 41 and the lowest was obtained in China (120.55 x 10<sup>3</sup>ha<sup>-1</sup>). In case of millable cane, the highest number of millable cane was found in BSRI Akh 41 (139.86 x 10<sup>3</sup> ha<sup>-1</sup>) and the second highest number of millable cane was found from the treatment VMC (123.91 x 10<sup>3</sup>ha<sup>-1</sup>) which was statistically identical to BSRI Akh 42 (120.67 x 10<sup>3</sup>ha<sup>-1</sup>) and I 61-90 (111.94 x 10<sup>3</sup>ha<sup>-1</sup>) and the lowest was obtained in China (98.137 x 10<sup>3</sup>ha<sup>-1</sup>). In case of height, The highest height of cane was found from I 61-90 (2.7833 meter) which was statistically identical to BSRI Akh 42 (2.7567 meter) and the lowest height of cane was found from the treatment China (1.1.5867 meter). In case of girth, The

highest girth of cane was found from the treatment China.(10.137 cm) , The second highest girth of cane was found from the treatment BSRI Akh 42 (9.417 cm) and the lowest height of cane was found from the treatment VMC (7.6983 cm). Highest yield of cane was obtained in I61-90 (118.08t ha<sup>-1</sup>). The second highest yield of cane was found in BSRI Akh 42 (117.43 t ha<sup>-1</sup>) and the lowest yield was found from the treatment China (94.523 t ha<sup>-1</sup>).

Table 1. Effect of Chewing clones /varieties on yield and yield parameters at farmer's field, Jamalpur

Treatment	No. of tillers (10 <sup>3</sup> ha <sup>-1</sup> )	No. of millable cane (10 <sup>3</sup> ha <sup>-1</sup> )	height (m)	girth (cm)	Brix (%)	Yield (tha <sup>-1</sup> )
T <sub>1</sub> = BSRI Akh 41	71.80b	64.71b	2.44c	8.41c	20.7ab	112.28b
T <sub>2</sub> = BSRI Akh 42	101.90a	66.80b	2.76a	9.43b	19.5b	114.77b
T <sub>3</sub> = I 61-90	86.51ab	71.87ab	2.74a	7.75d	20.5ab	129.99a
T <sub>4</sub> = VMC	86.16ab	79.02a	2.49b	7.61d	21.5a	108.32b
T <sub>5</sub> = China	68.88b	53.54c	1.61d	9.94a	17.58c	106.90b
LSD(.05)	29.78	9.46	0.04	0.24	0.620	8.316
CV %	19.71	7.74	1.02	1.56	3.85	3.99

Table 2. Effect of Chewing clones /varieties on yield and yield parameters at farmer's field, Sherpur

Treatment	No. of tillers (10 <sup>3</sup> ha <sup>-1</sup> )	No. of millable cane (10 <sup>3</sup> ha <sup>-1</sup> )	height (m)	girth (cm)	Brix (%)	Yield (tha <sup>-1</sup> )
T <sub>1</sub> = BSRI Akh 41	173.28a	139.86a	2.26b	8.32c	20.83b	96.29b
T <sub>2</sub> = BSRI Akh 42	132.32c	120.67ab	2.75a	9.41b	20.33 b	117.43a
T <sub>3</sub> = I 61-90	157.22b	111.94ab	2.78a	8.11c	20.33 b	118.08a
T <sub>4</sub> = VMC	170.02a	123.19ab	2.21c	7.69d	22.0 a	89.18b
T <sub>5</sub> = China	120.55d	98.13b	1.58d	10.13a	18.00 c	94.52b
LSD(.05)	8.91	29.36	0.06	0.27	0.48	6.16
CV %	3.25	13.59	1.41	1.72	2.91	3.30

### ***Economic analysis of Sugarcane varieties at farmer's field***

The economic analysis of the chewing varieties is presented in Table 3. Among the five varieties, BSRI Akh 42 gave the highest profit of Tk. 539.63 thousand per hectare and thus we found the highest BCR of 2.05.though the number of millable cane was not higher than the clones VMC. Meanwhile, The second highest , profit and BCR was found from the tasted clones VMC which was 291.21 X 10<sup>3</sup> ha<sup>-1</sup> and 1.11 respectively Though the clone I 61-90 is the best in respect of millable cane and cane yield particularly in Jamalpur region, but it has some disadvantages like comparatively lower number of tillers, lower number of millable cane and hard rind , lower girth than BSRI Akh 42.From the economic point of view BSRI Akh 42 is more acceptable than the clone I 61-90.But considering juice and goor production, I 61-90 is better. Therefore, the clone I 61-90 and the variety BSRI Akh 42 may be recommended for commercial cultivation as chewing varieties in AEZ 9 under non mill zone of Bangladesh.

The economic analysis of the chewing varieties is presented in Table 4. Among the five varieties, BSRI Akh 42 gave the highest profit of Tk. 1186.07 thousand per hectare and thus we found the highest BCR of 4.52.though the number of millable cane was not higher than the variety BSRI Akh 41. Meanwhile, The second highest, profit and BCR was found from the tasted variety BSRI Akh 41 which was 717.07 X10<sup>3</sup> ha<sup>-1</sup> and 2.73 respectively Though the clone I 61-90 is the best in respect of height, millable cane and cane yield particularly in Sherpur region, but it has some disadvantages like comparatively lower number of tillers, lower number of millable cane and hard rind, lower girth than BSRI Akh 42.

Table 3. Economic analysis of chewing varieties of sugarcane at farmer's field Jamalpur

Treatment	No. of millable cane ( $\times 10\text{ha}^{-1}$ )	price/mc ( $\times 10^3 \text{ ha}^{-1}$ ) (Tk.)	Income ( $\times 10^3 \text{ ha}^{-1}$ ) (Tk.)	cost of cultivation (Tk.)	profit ( $\times 10^3 \text{ ha}^{-1}$ ) (Tk.)	BCR
T <sub>1</sub> = BSRI Akh 41	173.28a	7.00	22.26b	251.97	20.83b	2.65
T <sub>2</sub> = BSRI Akh 42	132.32c	12.00	32.75a	251.97	24.33 a	4.23
T <sub>3</sub> = I 61-90	157.22b	7.50	28.78a	251.97	20.33 b	2.15
T <sub>4</sub> = VMC	170.02a	7.00	17.21c	251.97	22.0 a	2.29
T <sub>5</sub> = China	120.55d	7.50	11.58d	251.97	18.00 c	1.401

Table 4. Economic analysis of chewing varieties of sugarcane at farmer's field Sherpur

Treatment	No. of millable cane ( $\times 10\text{ha}^{-1}$ )	price/mc ( $\times 10^3 \text{ ha}^{-1}$ ) (Tk.)	Income ( $\times 10^3 \text{ ha}^{-1}$ ) (Tk.)	cost of cultivation (Tk.)	profit ( $\times 10^3 \text{ ha}^{-1}$ ) (Tk.)	BCR
T <sub>1</sub> = BSRI Akh 41	139.86 a	7.00	42.26b	251.97	17.07c	2.73
T <sub>2</sub> = BSRI Akh 42	120.67b	12.00	56.43a	251.97	46.07a	4.52
T <sub>3</sub> = I 61-90	111.94c	7.50	60.98a	251.97	37.58b	2.20
T <sub>4</sub> = VMC	123.19b	7.00	32.21c	251.97	50.36a	2.29
T <sub>5</sub> = China	98.139d	7.50	21.58d	251.97	10.072d	1.807

From the economic point of view BSRI Akh 42 is more acceptable than the clone I 61-90. But considering juice and goor production, I 61-90 is better. Therefore, the clone I 61-90 and the variety BSRI Akh 42 may be recommended for commercial cultivation as chewing varieties in AEZ 9 under non mill zone of Bangladesh.

### Conclusion

The clone I 61-90 and the variety BSRI Akh 42 may be recommended for commercial cultivation as chewing varieties in AEZ 9 under non mill zones of Bangladesh.

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